INTRODUCTION

Thyroid disorders are one of the common problems encountered in clinical practice with majority being benign in nature. They are endemic in mountainous regions of the world, where the soil, water and food supply contain little iodine.

The problem in clinical practice is to differentiate reliably few malignant tumors from the many harmless benign nodules so that a definitive preoperative tissue diagnosis of malignancy allows planning of appropriate surgery and relevant patient counseling.

The prevalence of thyroid swelling ranges from 4% to 10% in the general adult population and from 0.2% to 1.2% in children.[1] The majority of clinically diagnosed thyroid swellings are non neoplastic; only 5% to 30% are malignant and require surgical intervention.[2] In India, thyroid cancer comprises of 1% of all head and neck cancers.

Fine needle aspiration cytology (FNAC), being simple, readily available, reliable, time saving, minimally invasive and cost effective method is supposed to have high sensitivity and specificity. It is applied routinely as a useful and indispensible method for preoperative diagnosis of thyroid lesions.

FNAC has allowed a dramatic decrease in unnecessary surgeries in thyroid nodular disease but enhanced the percentage of malignant operated nodules over 50%. It

ABSTRACT

Aim: The aim of this study was to determine the sensitivity, specificity, positive predictive value and negative predictive value of Fine needle aspiration cytology (FNAC) in preoperative evaluation of thyroid swellings at our Institute and to assess the correlation between preoperative cyto-diagnosis and postoperative histopathological diagnosis.

Study Design: Retrospective study

Materials and Methods: Between January 2011 and December 2015 the records of all patients treated surgically for thyroid disease at General Surgery Department, Chalmeda Anandrao Institute of Medical Sciences were reviewed. All the patients had preoperative FNAC and histopathological examination of post-operative thyroid specimens.

Results: Out of 129 patients 7 were males and 122 were females. In FNAC 128 were diagnosed as benign of which 8 were diagnosed as malignant on histopathological examination. Only one case was diagnosed as malignant in both FNAC and histopathology. Overall sensitivity FNAC was 44.6 and specificity was 48.5%.

Conclusion: FNAC is a safe, readily available method in preoperative evaluation of thyroid swellings. FNAC has more specificity and positive predictive value than sensitivity and negative predictive value in detecting thyroid malignancy, therefore it can confirm a diagnosis of malignancy accurately but cannot rule out a malignancy as false negative results do occur.

Keywords: FNAC, thyroid gland, histopathology

A Study of Cyto-Histological Correlation in the Diagnosis of Thyroid Swelling

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is relied upon to distinguish benign from neoplastic or malignant thyroid nodules, thus, influencing therapeutic decisions. However, FNAC has its own limitations. Histopathological examination of surgically excised thyroid swelling is the most accurate way to determine the pathology.

MATERIALS AND METHODS

The study design was a retrospective study. Between January 2011 and December 2015 the records of all patients treated surgically for thyroid disease at General Surgery Department, Chalmeda Anand Rao Institute of Medical Sciences, karimnagar..

All the patients had preoperative FNAC and post operative histopathological examination. Sensitivity, specificity, positive predictive value and negative predictive value were calculated. For the purpose of this study, the following definitions and diagnostic categories are used: Benign Lesions include colloid nodules, colloid cysts, hyperplastic nodules, multinodular goiters and follicular adenomas while malignant lesions include papillary carcinoma, follicular carcinoma, medullary carcinoma, anaplastic carcinoma, lymphoma etc.

For description of cytologic diagnosis, the term follicular lesion is used for both follicular adenoma and carcinoma because cytologic separation of these entities is often impossible by FNAC hence FNAC diagnosis of follicular adenoma was excluded in calculating sensitivity, specificity, PPV and NPV.

Inclusion Criteria

Those patients presented to General Surgery Department with thyroid swelling, who underwent FNAC, thyroid surgery and histopathological examination within the study period were included in the study.

Exclusion Criteria

Those patients having recurrence, FNAC done but did not have thyroid surgery were excluded.

RESULTS

In this study of 129 thyroid swellings, patients were grouped in age groups of 0-20; 21-40; 41-60 and 61-80 years & patients in each age group were 11%; 57%; 26% and 6% respectively. Most of the patients were in age group of 21-40 years. Female were higher in frequency (n=122; 94.5%) than male (n=7; 5.5%).

On FNAC, 103 cases (79.8%) were non-neoplastic and 26 cases (20.2%) were neoplastic disease. Among the non-neoplastic swellings, colloid nodular goiter was the most common with 81 cases (78.6%), followed by adenomatoid nodule with 10 cases (9.7%) and multinodular goiter(MNG) which was 5 cases (4.8%). Among the neoplastic thyroid swelling and follicular neoplasms were the most common with 22 cases (84.6%) and they were excluded from calculations of sensitivity, specificity, PPV and NPV as it is a known fact that follicular neoplasms on FNAC can be follicular adenoma or follicular carcinoma on histopathology.

After post operative histopathological examination, 73 cases (56.5%) were found non-neoplastic and 56 cases (43.4%) were found neoplastic. Among the seventy three cases of non-neoplastic thyroid swellings and colloid nodular goiters were 47 cases (64.3%), followed by MNG with 9 cases (12.3%), colloid cyst with 8 cases (10.9%) cases, hashimotos thyroiditis with 7 cases (9.5%), and one case each of chronic thyroiditis (1.3%) and adenomatoid nodule (1.3%).

Among the neoplastic thyroid swelling, follicular adenoma was the most common with 46 cases (82.1%), followed by papillary carcinoma with 8 (14.2%) cases, one case each of follicular carcinoma and severe squamous dysplasia.

DISCUSSION

FNAC contributes significantly to the preoperative investigation in patients with thyroid swelling but despite
its well recognized value, there are limitations to the technique. The reported pitfalls are those related to specimen adequacy, sampling techniques, skill of the aspirator performing the aspirations, experience of the cytopathologist interpreting the aspirate and overlapping cytological features between benign and malignant follicular neoplasms and inadequate, indeterminate FNA.

One major limitation of thyroid cytology, its inability to distinguish between follicular adenoma from follicular carcinoma. This diagnosis requires detailed histological examination for vascular or capsular invasion and cannot be reliably made on routine FNAC specimens. Hence, follicular neoplasm (lesion) is given as diagnosis in FNAC.

In our study of 129 cases, majority of cases were seen in the age group of 21-40 years (57%). Females were higher in frequency (94.5%) than males (5.5%). The youngest patient of this series was a boy of 15 years with papillary carcinoma and the oldest patient was a female of 76 years a case of cystic colloid nodule with lymphocytic thyroiditis.

In this study, FNAC showed 20.1% neoplastic cases. Among neoplastic thyroid swellings, follicular neoplasm was the most common with 84.6%, followed by papillary carcinoma 3.8%. Carcinoma of thyroid is the most common malignancy of endocrine system comprising 0.6% and 1.6 of all cases of malignant neoplasm in men and women respectively.

In the present study, among non neoplastic thyroid swelling (79.8%), colloid nodular goitre was the commonest 78.6%, followed by adenomatoid nodule which was 9.7% and multi nodular goitre with 4.8%. The study reported by Md. Shafiqul Islam showed 78% non-neoplastic and 22% neoplastic.

Though the sensitivity, specificity and accuracy of FNAC varies widely from as low as 50-60% to as high as 95% in various studies, it is the preoperative investigation of choice for cytological evaluation of thyroid swellings as other modalities like Incision biopsy, punch biopsy and trucut biopsy are not feasible and FNAC is readily available.

While comparing FNAC with histopathological examination (HPE) in the present study, 3.8% of MNG proved to be 6.9% in HPE. Out of 5 cases of MNG in FNAC one case was found to be severe squamous dysplasia in histopathology. Out of 22 follicular neoplasms on FNAC one case each came out to be Follicular carcinoma, Papillary carcinoma and multinodular goiter and the remaining as follicular adenoma. Of the 8 papillary carcinomas on histopathology, FNAC results were one each of papillary carcinoma, adenomatoid nodule, MNG and follicular neoplasm, 4 were colloid nodular goiters.

Cytohistological correlation was present in 73.7% of cases in this study. Monisha et al., 2011 reported cytological correlation in 80% of cases. Pinky Pandey et al. 2012 also reported cytohistological concordance in 80.28% of the cases.

Sensitivity shows the portion of the patients having non-malignant thyroid disease and positive cytological diagnosis on FNAC, which is found to be 44.6%.
Specificity shows the portion of the patients with non-malignant thyroid disease and positive cytological diagnosis, which was found to be 48.5%. Positive predictive value (PPV) is the probability of having malignant thyroid disease following a positive FNAC finding and is found to be 100%.

Negative predictive value (NPV) is the probability of not having malignant thyroid disease following a negative FNAC finding and is found to be 10%.

CONCLUSION

FNAC thyroid is a simple, safe and cost-effective diagnostic modality in the investigation of thyroid disease with more specificity than sensitivity in detecting thyroid malignancy, therefore it can confirm a diagnosis of malignancy accurately but cannot rule out a malignancy.

Our study showed that FNAC diagnosis of malignancy is highly significant. A benign FNAC diagnosis should be viewed with caution as false negative results do occur and these patients should be followed up and any clinical suspicion of malignancy even in the presence of benign FNAC requires surgery. So, final diagnosis and further treatment pattern should be based upon histopathology.

CONFLICT OF INTEREST:

The authors declared no conflict of interest.

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REFERENCES


Table 1: Variations in diagnosis of FNAC and Histopathology

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Figure 6: FNAC of Papillary carcinoma.